

## WHAT IS CLAIMED IS:

- 1     1.       A low-friction sliding mechanism, comprising:  
2               a first sliding member having a sliding surface, at least the sliding  
3 surface of the first sliding member being made of a diamond-like carbon  
4 material;  
5               a second sliding member having a sliding surface slidable relative to  
6 the sliding surface of the first sliding member, at least the sliding surface of the  
7 second sliding member being made of either one of an aluminum-based alloy  
8 material, a magnesium-based alloy material and a diamond-like carbon  
9 material; and  
10              a lubricant applied to the sliding surfaces of the first and second  
11 sliding members, the lubricant comprising at least one of an ashless fatty-ester  
12 friction modifier and an ashless aliphatic-amine friction modifier.
- 1     2.       A low-friction sliding mechanism according to Claim 1, wherein the  
2 diamond-like carbon material of the first sliding member is hydrogen-free  
3 amorphous carbon.
- 1     3.       A low-friction sliding mechanism according to Claim 1, wherein the  
2 aluminum-based alloy material of the second sliding member is a hypoeutectic  
3 or hypereutectic aluminum alloy containing 4 to 20% by mass silicon and 1.0  
4 to 5.0% by mass copper.
- 1     4.       A low-friction sliding mechanism according to Claim 1, wherein the  
2 magnesium-based alloy material of the second sliding member is at least one  
3 alloy selected from the group consisting of magnesium-aluminum-zinc alloys,  
4 magnesium-aluminum-rare earth metal alloys, magnesium-aluminum-calcium  
5 alloys, magnesium-zinc-aluminum-calcium alloys,  
6 magnesium-aluminum-calcium-rare earth metal alloys,  
7 magnesium-aluminum-strontium alloys, magnesium-aluminum-silicon alloys,

8 magnesium-rare earth metal-zinc alloys, magnesium-silver-rare earth metal  
9 alloys and magnesium-yttrium-rare earth metal alloys.

1 5. A low-friction sliding mechanism according to Claim 1, wherein the  
2 diamond-like carbon material of the second sliding member is hydrogen-free  
3 amorphous carbon.

1 6. A low-friction sliding mechanism according to Claim 1, wherein each  
2 of the sliding surfaces of the first and second sliding member has an arithmetic  
3 mean roughness of 0.1  $\mu\text{m}$  or less.

1 7. A low-friction sliding mechanism according to Claim 1, wherein the  
2 first sliding member comprises a base and a coating of the diamond-like carbon  
3 material applied to the base to define the sliding surface, the coating has a  
4 thickness of 0.3 to 2.0  $\mu\text{m}$  and a micro Vickers hardness  $H_V$  of 1000 to 3500 as  
5 measured by application of a 10 g load, the second sliding member is made of  
6 the aluminum-based alloy material, and the sliding surface of the second  
7 sliding member has a Brinell hardness  $H_B$  of 80 to 130.

1 8. A low-friction sliding mechanism according to Claim 1, wherein the  
2 first sliding member comprises a base and a coating of the diamond-like carbon  
3 material applied to the base to define the sliding surface, the coating has a  
4 thickness of 0.3 to 2.0  $\mu\text{m}$  and a micro Vickers hardness  $H_V$  of 1000 to 3500 as  
5 measured by application of a 10 g load, the second sliding member is made of  
6 the magnesium-based alloy material, and the sliding surface of the second  
7 sliding member has a Brinell hardness  $H_B$  of 45 to 95.

1 9. A low-friction sliding mechanism according to Claim 1, wherein each  
2 of the first and second sliding members comprises a base and a coating of the  
3 diamond-like carbon material applied to the base to define the sliding surface,  
4 and the coating of each of the first and second sliding members has a thickness

5 of 0.3 to 2.0  $\mu\text{m}$  and a micro Vickers hardness  $H_V$  of 1000 to 3500 as measured  
6 by application of a 10 g load.

1 10. A low-friction sliding mechanism according to Claim 1, wherein the  
2 sliding mechanism is for use in an internal combustion engine.

1 11. A low-friction sliding mechanism according to Claim 1, wherein the  
2 fatty-ester friction modifier and the aliphatic-amine friction modifier are a fatty  
3 acid ester and an aliphatic amine having  $\text{C}_6\text{-C}_{30}$  straight or branched  
4 hydrocarbon chains, respectively, and said at least one of the fatty-ester friction  
5 modifier and the aliphatic-amine friction modifier is contained in an amount of  
6 0.05 to 3.0% by mass based on a total mass of the lubricant.

1 12. A low-friction sliding mechanism according to Claim 1, wherein the  
2 lubricant further comprises polybutenyl succinimide and/or a derivative thereof.

1 13. A low-friction sliding mechanism according to Claim 12, wherein the  
2 polybutenyl succinimide and/or the derivative thereof is contained in an  
3 amount of 0.1 to 15% by mass based on a total mass of the lubricant.

1 14. A low-friction sliding mechanism according to Claim 1, wherein the  
2 lubricant further comprises zinc dithiophosphate in an amount of 0.1% or less  
3 by mass in terms of an phosphorus element based on a total mass of the  
4 lubricant.